

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

(12) UK Patent Application (19) GB (11) 2 124 672 A

(21) Application No 8218450
(22) Date of filing 25 Jun 1982
(43) Application published
22 Feb 1984

(51) INT CL³
E04D 1/12 1/36

(52) Domestic classification
E1D 2023 F120 LEKG2

(56) Documents cited
GB A 2091776
GB A 2048978
GB 1585904
GB 1353902

(58) Field of search
E1D

(71) Applicants
Paul Tisley Sant,
Broxash,
Litmarsh,
Marden,
Hereford.

(72) Inventors
Paul Tisley Sant

(74) Agent and/or Address for
Service
S. Jones-Robinson,
The Laurels,
320 London Road,
Charlton Kings,
Cheltenham,
Gloucestershire
GL52 6YJ.

(54) Roof tiles

(57) Joint strips 6 of I section have upper flanges 8 which are engaged in the grooves 3 of two adjoining roof tiles 4 and 9. Raised ribs 11 on the upper surfaces of the lower and upper flanges 7 and 8 of the strips 6 define run-off channels for rain-water entering the gap 12 between the tiles 4 and 9, which gap is sealed by the strip 6. The tiles may be secured by nailing to the roof battens, or by securing the strips 6 to the battens. In either case the bottom edges of the tiles may be held down by under clips which engage in the grooves 3 and hook over the top edges of a lower tile. The tiles may have an expanded plastics cover surrounded by a skin of glass-fibre reinforced cement/sand mix.

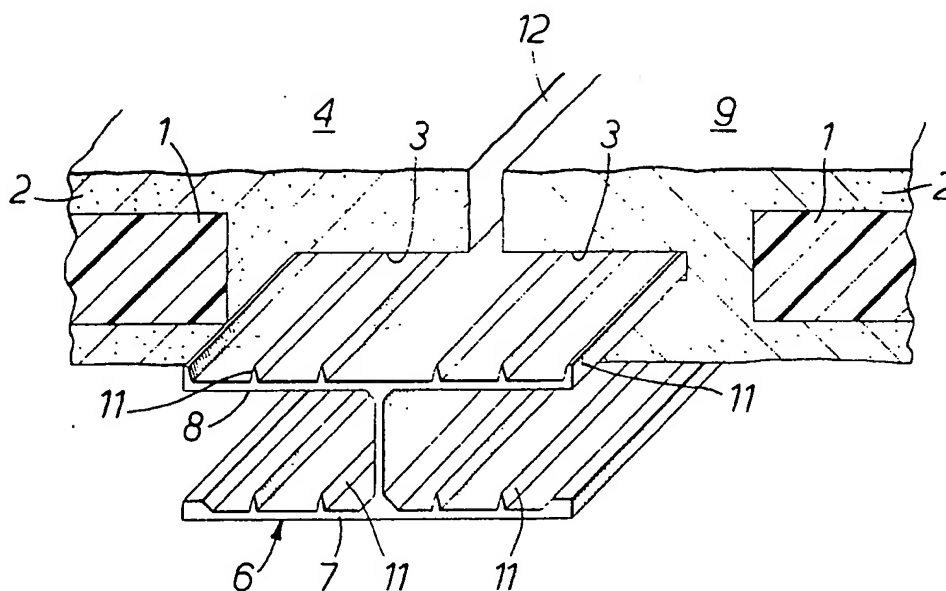
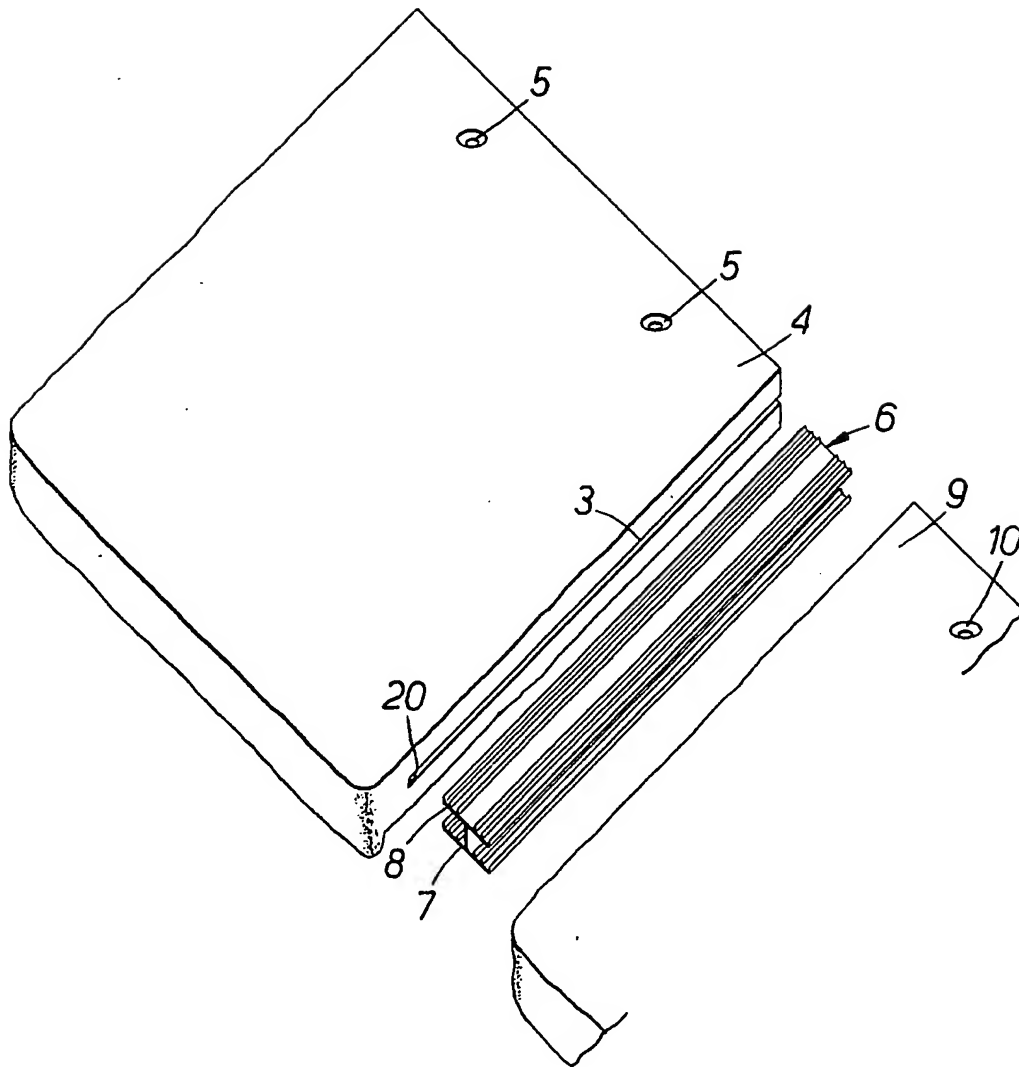


FIG. 2.

The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

1/4

*Fig. 1.*

2/4

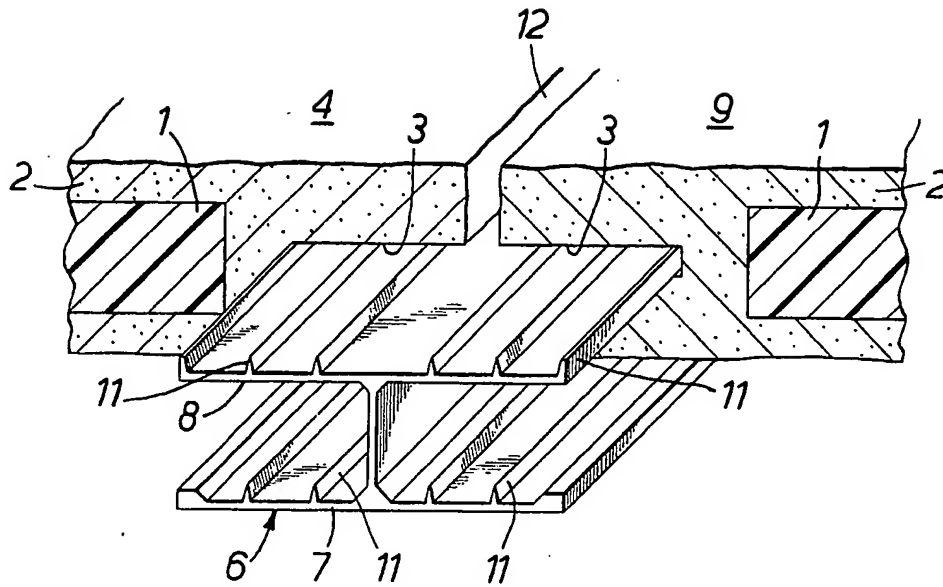


FIG. 2.

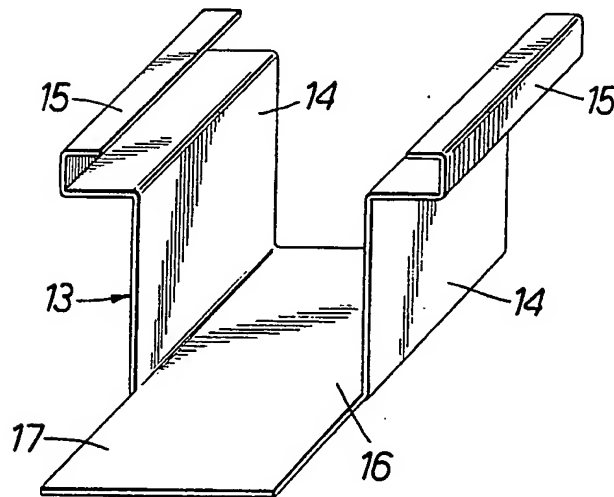
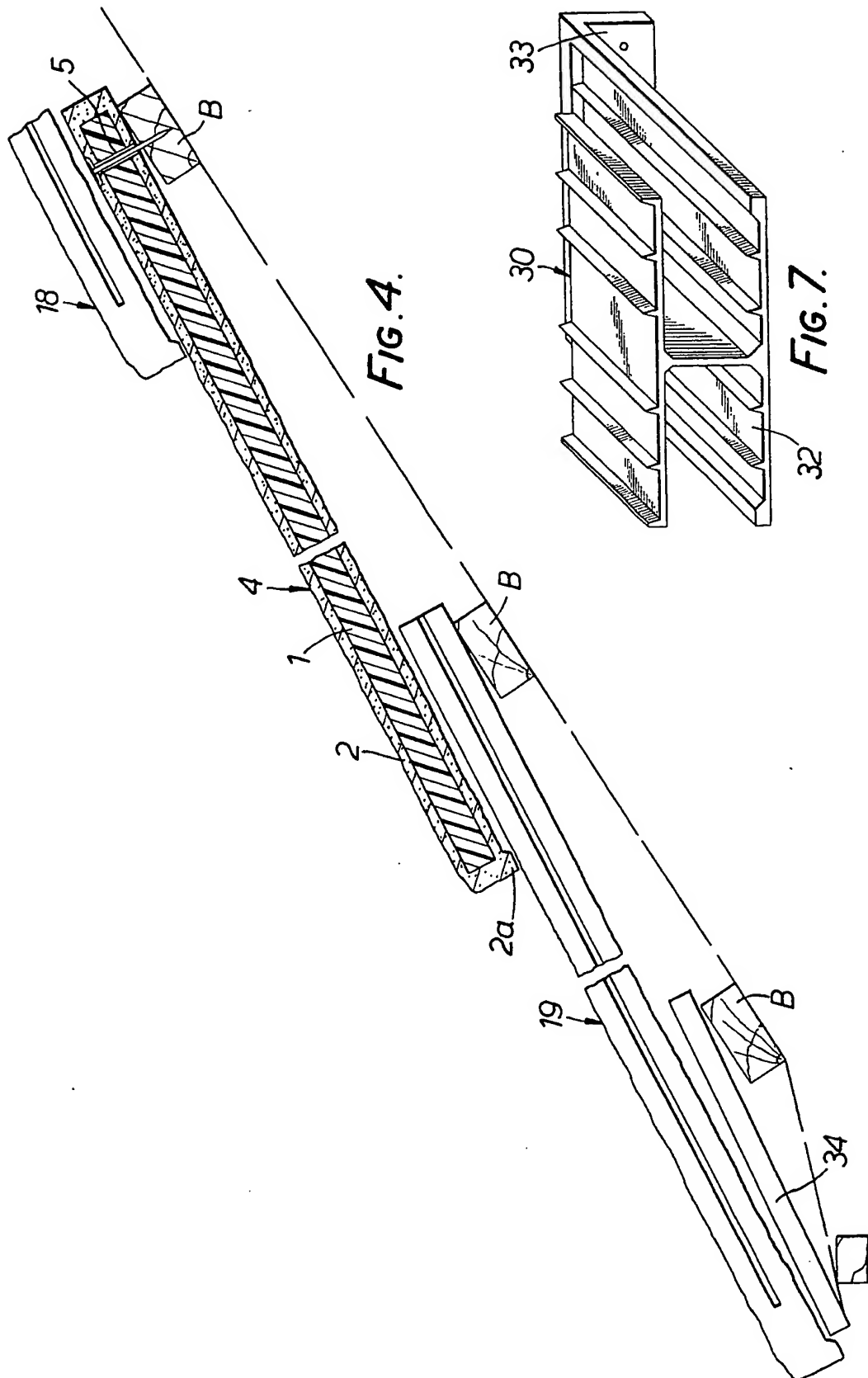


FIG. 3.

3/4



4/4

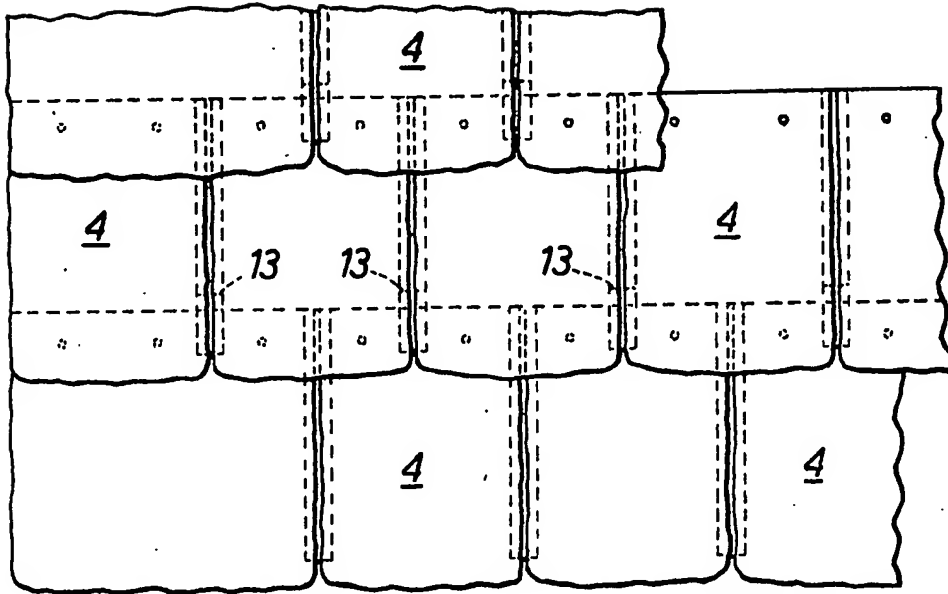


FIG. 5.

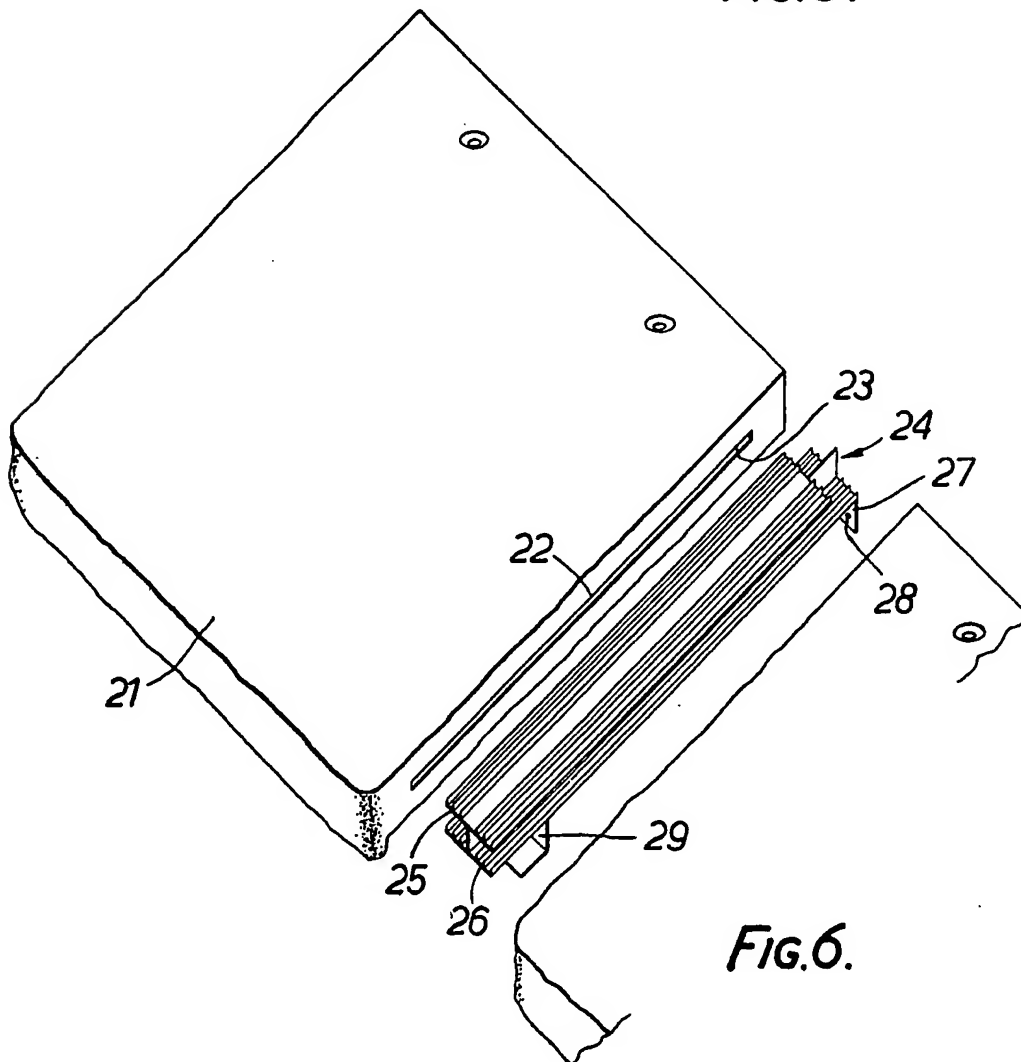


FIG. 6.

SPECIFICATION

Roof tiles and tiling

5 This invention relates to roof tiles and tiling, and has for its object to provide a new form of roof tile and method of roof tiling utilising such a tile. A further object is to provide a light-weight tiled roof covering, and in particular such a roof covering which can be designed to simulate a traditional and heavy stone-tiled roof.

According to one aspect of the invention a roof tile is slotted along its lateral side edges, to receive a joint strip or bracket which seals the lateral gap between two adjoining tiles and provides a run-off channel for rainwater entering that gap.

According to another aspect of the invention a method of roof tiling includes laying the tiles with edge grooves in horizontal rows alternately with the fitting of joint strips or brackets which are each received in the facing edge grooves of the tiles on either side of the strip or bracket, the rows of tiles being laid so that each tile is only partially overlapped by the tiles disposed in the rows thereof immediately above and below.

Due to the fact that the tiles are only partially overlapped by tiles above and below, with the gaps which would otherwise be left sealed by the joint strips or brackets of the invention, even for the same weight of tile a very much lighter structure results as the same number of tiles can cover a considerably greater area. This advantage may be still further increased by use of a light-weight tile structure, which may be moulded and finished to simulate a conventional stone tile.

Such a light-weight tile may comprise a body of, or largely consisting of, cellular plastics material supporting an outer top surface layer of glass-fibre reinforced cement/sand mix. This surface layer may be coloured and/or finished to simulate any desired form of tile, for example have a stone dust finish to simulate a stone tile, and the cellular body may be a foamed plastics sheet encased in a surrounding skin of the glass-fibre reinforced cement/sand mix. The result is an exceptionally light-weight but strong tile, so that the supporting roof timbers can be correspondingly light, and also a tile with a high degree of heat insulation so that thermal insulation costs are also reduced. In addition to providing excellent thermal insulation, it can be expected that interstitial condensation may be reduced.

The tiles may have holes adjacent their upper ends for fixing to the roof battens in the usual way by means of galvanised nails, copper rivets and the like, in which case the joint strips need only be lightly secured or even held in place solely by their engagement with the tile grooves. Tile under clips, which engage with the joint strips and below the lower row of tiles, may be fitted to prevent wind lift of the tiles. However, the joint strips may engage the grooves in a manner which fixes the tiles to the roof, in which case the strips are correspondingly firmly fixed to the roof battens.

The joint strips are conveniently of I section, to provide an upper flange which is received in the tile

grooves and a lower flange which extends beneath the tiles. Such a section may be extruded or moulded from hard plastics material or metal, of GRP construction or otherwise fabricated, and the upper sides of said flanges may have longitudinal ribs between which run-off channels are defined.

The invention will now be further described with reference to the accompanying drawings which illustrate, by way of example, tiles and tiling in accordance with the invention. In the drawings:

Figure 1 is an axonometric sketch showing the laying of two adjoining tiles,

Figure 2 is a detail and part-sectioned view showing two tiles and an associated jointing strip in final position;

Figure 3 illustrates a tile under clip for use with such a tile/strip arrangement;

Figure 4 is a horizontal sectional view showing the overlap of adjoining rows of tiles;

Figure 5 is a fragmentary view of the resultant tiled roof;

Figure 6 illustrates an alternative form of tile and fixing in a manner similar to *Figure 1*; and

Figure 7 illustrates an alternative form of joint strip.

The tiles illustrated are a sandwich construction with a central expanded plastics core 1 surrounded by a moulded-on skin 2 of glass-fibre reinforced cement/sand mix which, in particular, provides the water-impervious upper surface of the tile. This surface is appropriately contoured and has a stone dust finish to simulate stone tiles. At the lateral side edges the skin 2 is of increased thickness to accommodate a longitudinal edge groove 3 which may be moulded in or subsequently machine cut in the tile. At their bottom edges the tiles are moulded with a lower end lip 2a.

The tiles are of a range of widths (for example, 150, 225, 300, 450, 600 and 750 mm widths and 400 and 600 mm length) to achieve a random appearance, such as obtains with traditional stone tiling, and to provide an accurate fit for any width of roof. The central core 1 is of expanded closed-cell polystyrene (preferably) or polyurethane, which provides a stressed skin structure to produce an extremely light-weight tile of exceptional strength. With a typical tile thickness of 20 mm and 24 mm over the lower lip 2a, for example, the weight of a 400 mm by 300 mm tile would be about 3.7 kgm. The core 1 further provides excellent thermal insulation properties.

Referring now to *Figures 1* to *4* of the drawings, a tile 4 of the described construction is fixed to a roof batten B by nailing through indented nail holes 5. An H-section joint strip 6 is then fitted, with its lower flange 7 extending below the tile 4 and its upper flange 8 received in the adjacent edge groove 3 in the tile 1. The next tile 9 is then fitted over the strip 6 in a similar manner, as shown in *Figure 2*, and fixed to the roof batten B by nailing through the nail holes such as 10. A symmetrical arrangement of raised ribs runs along the upper surfaces of the strip flanges 7 and 8 (see *Figure 2*) to define run-off channels for rain-water entering the gap 12 between the tiles 4 and 9. The spacing of the central two ribs

11 on the upper flange 8 is 12 mm, so that this channel is wider than the gap 12.

A tile under clip 13, as illustrated in Figure 3, is fitted between each adjoining pair of tiles to prevent wind lift, such fitting being indicated by the exceptionally low weight of the tiles. The clip 13 is of pressed form, with parallel upstanding sides 14 each terminating in an inwardly facing channel section 15. The base 16 of the clip has a projecting tongue 17 which is hooked under a tile in the row below, and the sections 15 engage the edges of the lower flange 7 of the corresponding strip 6. Thus the clips 13 are positioned as illustrated in Figure 6.

Figures 4 and 5 show how each tile such as 4 is only partially overlapped by tiles above and below, 18 and 19 respectively in Figure 4. The joint strip 6 seals the gap 13 where there is no tile overlap, and as the tiles do not have to completely overlap this further decreases the roof loading as compared with a conventional stone tile roof. Each side edge groove 3 extends from the upper end of a tile but terminates short of the lower end at 20, providing an end wall which is engaged by the lower end of the corresponding strip flange 8 to retain the strip 6 in position. Thus the strips 6 do not require separate fixing.

The tile 21 illustrated in Figure 6 is of the same sandwich construction but the edge grooves 22 now terminate short of each end of the tile, particularly at a rectangular end wall 23 at the top end. This form of groove is used with a different form of joint strip 24 with a fore-shortened upper flange 25, which is received in the edge grooves 22 of the associated tiles 21, and a lower flange 26 which as before extends below the tile edges. At the upper end the strip 24 has a downwardly extending bracket 27 which hooks over a batten and is nailed thereto through nail holes such as 28. Thus in this case it is the strips 24 which are fixed, and engagement with the tiles 21 fixes the latter and separate tile fixing is not required. Adjacent its lower end each strip 24 has a lower angle bracket which hooks over the top edge of a lower tile, so that the under clips such as 13 are not required.

Figure 7 is a detail view of an alternative form of joint strip 30 with upper and lower flanges 31 and 32 which engage and fix the tiles 21 in the same manner as described in connection with the strip 24. An upper end bracket 33 is provided corresponding to the bracket 27 of Figure 6, but in this strip 30 no lower bracket is provided. Thus the use of separate under clips such as 13 is again indicated.

It will be appreciated that a simulated stone tiled roof is provided which does not have the disadvantages of weight and lap requirement, necessary with stone tiles to prevent the ingress of moisture. The strength of a traditional tile is retained.

Undercloak tiles of similar construction (as at 34 in Figure 4) are used at the bottom edge of the roof. Such undercloak tiles conveniently have a size of 400 by 488 mm, and a tiled roof in accordance with the invention should be water-tight down to a pitch of 30°.

The tiles of the invention are a preferable alternative to modern concrete tiles which overcome the lap problem of stone tiles, and some but much less of

the weight problem, by a small half-lap detail at each lateral side edge of the tiles. Apart from not having the appearance of a stone tile, such concrete tiles have the further disadvantage that they are easily split and the edge detail is fragile.

CLAIMS (Filed on 27.6.83)

1. A roof tile which is slotted along each of its lateral side edges, to receive a joint strip or bracket which seals the lateral gap between two adjoining tiles when fitted to a roof and provides a run-off channel for rain-water entering that gap.

2. A tile according to claim 1, comprising a body of, or largely consisting of, cellular plastics material supporting an outer top surface layer of glass-fibre reinforced cement/sand mix.

3. A tile according to claim 2, wherein said cellular body is a foamed plastics sheet encased in a surrounding skin of the glass-fibre reinforced cement/sand mix.

4. A tile according to claim 2 or claim 3, wherein the cellular plastics material is closed-cell polystyrene or polyurethane.

5. A tile according to any one of claims 2 to 3, wherein the outer top surface layer of the tile is coloured and/or finished to simulate a conventional type of tile.

6. A tile according to claim 5, wherein the outer top surface is appropriately contoured and has a stone dust finish to simulate a stone tile.

7. A tile according to any one of the preceding claims, wherein the tile has holes adjacent its upper end for fixing to the roof battens in the usual way by means of galvanised nails, copper rivets and the like.

8. A tile according to any one of the preceding claims, wherein the side edge grooves therein terminate short of the bottom end of the tile.

9. A tile according to claim 8, wherein the side edge grooves therein also terminate short of the top end of the tile.

10. The combination of tiles according to any one of the preceding claims and the joint strips or brackets each formed with flanges or the like adapted to be received in the side edge grooves of two adjoining tiles on a roof.

11. The combination of claim 10, wherein the joint strips are of I section, to provide an upper flange which is receivable in the tile grooves and a lower flange which extends beneath the tiles.

12. The combination of claim 11, wherein the upper sides of said flanges have longitudinal ribs between which run-off channels are defined.

13. The combination of any one of claims 10 to 12, wherein the joint strips have dependent bracket portions adapted to hook over and/or to be fixed to the roof battens.

14. The combination of any one of claims 10 to 13, wherein the joint strips have dependent bracket portions adapted to hook over the top edge of a lower tile.

15. The combination of any one of claims 10 to 12, including under clips each adapted to engage in the side edge grooves of two adjoining tiles and to hook over the top edge of a lower tile.

16. The combination of any one of claims 10 to 15 with tiles in accordance with claim 6, wherein the tiles are in a range of widths such as to allow a resultant tiled roof with random appearance, such as that exhibited by traditional stone tiling, to be obtained.

17. A method of roof tiling which includes laying tiles, which tiles have side edge grooves, in horizontal rows alternately with the fitting of joint strips or brackets which are each received in the facing edge grooves of the two tiles on either side of the joint strip or bracket, the rows of tiles being laid so that each tile is only partially overlapped by the tiles disposed in the rows thereof immediately above and below.

18. A method according to claim 17, wherein the tiles have indented nail holes adjacent the top ends of the tiles and are secured by nailing to the roof battens.

19. A method according to claim 17, wherein the joint strips or brackets have dependent portions which are hooked over and/or are fixed to the roof battens for location purposes and to secure the tiles.

20. A method according to any one of claims 17 to 19, wherein the joint strips or brackets have lower portions which are hooked over the top edges of tiles disposed in a lower row thereof.

21. A method according to any one of claims 17 to 19, wherein the tiles are held down by underclips each of which engages in the side edge grooves of two adjoining tiles and hooks over the top edge of a lower tile.

22. A tile substantially as herein particularly described with reference and as illustrated in Figure 1 or Figure 6 of the accompanying drawings.

23. The combination of tiles, joint strips or brackets and under clips, substantially as herein particularly described with reference to Figures 1 to 3, Figure 6, or Figure 7 of the accompanying drawings.

24. A method of tiling a roof, substantially as herein particularly described with reference to Figures 1 to 5, Figure 6, or Figure 7 of the accompanying drawings.